REMARKS

Claims 1-22 are all the claims presently pending in the application.

It is noted that the claims have been amended solely to more particularly point out Applicant's invention for the Examiner, and not for distinguishing over the prior art, narrowing the claim in view of the prior art, or for statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Attached hereto is a marked-up version of the changes made to the specification and/or claims by the current Amendment. The attached pages are captioned "**Version with markings to show changes made**".

Claims 1-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kawabe (U.S. Patent No. 6,162,654) (hereinafter "Kawabe") in view of Zhong et al. (U.S. Patent No. 5,994,721) (hereinafter "Zhong"), Kashiwazaki et al. (U.S. Patent No. 5,922,401) (hereinafter "Kashiwazaki") and Lee (Applicant's Admitted Prior Art).

This rejection is respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

Applicant's invention, as defined for example in independent claim 1 and substantially similarly in independent claims 2, 6, and 7) is directed to an active matrix liquid crystal display device (LCD) having a color filter on a substrate on which switching elements are formed.

A feature of the present invention is that a stacking layer of the passivation layer and the color filter are formed near the contact hole to reduce the thickness of the color filter formed near the contact hole. Additionally, the passivation layer formed under the color filter can prevent developer from entering to the under part of the color filter through the contact hole when the color filter made of resist is developed.

An additional feature of the present invention, as described in the Amendment filed on April 30, 2002, is that a portion of a passivation film, covering a display area to be covered with a color filter, is selectively removed and a hole formed therein. Then, the hole area is filled with a color filter while another portion of the passivation film covers a thin film transistor (TFT).

Thus, it is possible to make a color filter on a contact portion and on a pattern outline portion thin, while the color filter on the pixel opening portion is thick. In this manner, a high photosensitive color resist can be used and a fine pattern with small exposure can be formed. Thus, an LCD having good display quality, high precision and a high aperture can be manufactured (e.g. see page 5, lines 13-24; page 11, lines 25-27; page 12, lines 1-2; page 13, lines 9-18; and page 17, lines 1-12)

An exemplary configuration of the on-chip color filter is shown in Figs. 3(b) and 4(a)-4(c) of the application.

The conventional structures, such as those discussed below and in the Related Art section of the present application, do not have such a structure, and fail to provide for such an operation.

Indeed, such features are clearly not taught or suggested by the cited references.

II. THE REJECTION BASED ON KAWABE IN VIEW OF ZHONG, KASHIWAZAKI, AND LEE

The Examiner asserts that:

> *[regarding claim 1, 2, and 15] Kawabe discloses in Figure 8, an active matrix liquid crystal display (LCD) with a passivation layer, 7, over the TFT and under the color filter 41. Kawabe also discloses an alignment layer, 10, (Applicant's overcoat layer) disposed over the color filters. Kawabe does not explicitly disclose a color filter disposed directly on the active matrix substrate, nor does Kawabe disclose removal of the passivation layer from the light transmission region.*

However, Applicant respectfully submits that the Examiner's assertions are erroneous.

First, no fewer then four (4) references are being relied upon in an attempt to yield the present invention. This, on its face, evidences the Examiner's keyword search and subsequent "application" of the references are based on nothing more than impermissible hindsight.

In a non-limiting embodiment of the present invention, as defined by independent claim 1 (and substantially similarly by independent claims 2, 6 and 7), the present invention discloses a stacking layer of the passivation layer and the color filter are formed near the contact hole to reduce the thickness of the color filter formed near the contact hole. This structure enables the forming of a contact hole with a fine and a good shape.

Moreover, the passivation layer formed under the color filter can prevent developer from entering to the under part of the color filter through the contact hole when the color filter made of resist is developed.

In contrast to the present invention, Kawabe discloses an LCD with a passivation layer over the TFT and under the color filter. Kawabe does not disclose or suggest removing the gate insulating film and the passivation layer in the pixel region. Instead, Kawabe discloses forming the color filter on the pixel electrode.

Moreover, Kawabe does not disclose or suggest that the contact hole is formed in the color filter and the passivation layer. Also, the orientation layer 10 of Kawabe is much different from the overcoat layer 19 (e.g., as shown in Fig. 5) of the present invention. The orientation layer 10 of Kawabe may correspond to an alignment layer (e.g., not shown in the present invention as described on page 15 of the specification) not to the overcoat layer 19. Thus, Kawabe does not teach or suggest "*said overcoat layer is formed on said filter*", as defined by the independent claims of the present invention.

Zhong discloses removing the gate insulator in the pixel region. However, Zhong does not disclose or suggest the stacking layer of the passivation layer and the color filter formed near the contact hole. Therefore, even if Kawabe is combined (arguendo) with Zhong, removing the passivation layer in the pixel region and forming the stacking layer of the passivation layer and the color filter near the contact hole would not have been obvious to

a person having ordinary skill in the art, because additional fabrication steps would be necessary. Thus, even if (arguendo) Zhong were to be combined with Kawabe there still would be no teaching or suggestion of "*a stacking layer of said passivation film and said color filter is formed near said contact hole*, as defined by independent claim 1.

Kashiwazaki discloses a method of removing the gate insulating film and the passivation film from the light transmission area and subsequently disposing the color filter directly onto the active matrix substrate to avoid defects such as color mixing and color irregularity.

Kashiwazaki does not disclose or suggest a stacking layer of the passivation layer and the color filter only near the contact hole. Therefore, even if Kashiwazaki were to be applied to Zhong, forming the stacking layer and the color filter only near the contact hole is not obvious to a person having ordinary skill in the art. Instead, Kashiwazaki only discloses the contact hole formed in the black matrices which is much different from the structure of the present invention. Thus, Kashiwazaki, even in combination (arguendo) with Zhong, also would not teach or suggest "*a stacking layer of said passivation film and said color filter is formed near said contact hole*, as defined by independent claim 1.

Lee teaches using an overcoat layer between the color filter and the ITO electrode layer. But, Lee does not disclose or suggest forming the color filter layer and the overcoat layer on the TFT. Even if Lee is applied to Zhong, forming the stacking layer of the passivation layer and the color filter only near the contact hole would not have been obvious to a person having ordinary skill in the art, because Lee does not disclose or suggest the contact hole connecting the pixel electrode and the TFT.

Accordingly, it would not have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify a conventional RGB active matrix LCD configuration with a stacking layer of the passivation layer and the color filter formed near the contact hole to reduce the thickness of the color filter formed near the contact hole.

Thus, as described above the Examiner's urged combination of references fails to provide a prima facie case of obviousness, and such an urged combination would therefore only appear to be based upon a reading of Applicant's own specification and impermissible

hindsight.

Hence, turning to the clear language of independent claim 1 (and substantially similarly independent claims 2, 6, and 7), there is no teaching or suggestion of "*[an] active matrix liquid crystal display device comprising:*

a first substrate and a second substrate, at least one of said first and second substrate being transparent;

a plurality of scanning lines formed on said first substrate;

a plurality of signal lines formed on said first substrate crossing said scanning lines in a matrix manner;

a plurality of thin film transistors formed at each of intersections of said scanning lines and said signal lines;

a passivation film formed on said thin film transistors;

at least one color filter formed on said first substrate;

a plurality of pixel electrodes connected to each of said thin film transistors through a contact hole;

a counter electrode formed on said second substrate; and

a liquid crystal layer between said first and second substrate being driven by an electric field between said pixel electrode and said counter electrode to thereby make a display,

wherein said color filter is formed directly on said first substrate in most of a light transmission region within a pixel area surrounded by said scanning lines and said signal lines, and

a stacking layer of said passivation film and said color filter is formed near said contact hole, and said overcoat layer is formed on said filter, and said pixel electrode is formed on said color filter".

For the reasons stated above, independent claims 1, 2, 6, and 7 are fully patentable over the cited references.

Further, dependent claims 3-5, 8-10, and 11-22 when combined with their respective independent claims provide additional novel and non-obvious features.

Further, the other prior art of record has been reviewed, but it too even in combination

with Kawabe, Zhong, Kashiwazaki, and Lee fails to teach or suggest the claimed invention.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-22, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

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Respectfully Submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

1. (Twice Amended) An active matrix liquid crystal display device comprising:

a first substrate and a second substrate, at least one of said [the] first and second substrate being transparent;

[a liquid crystal layer between the first and second substrate;

a color filter,

said first substrate including] a plurality of scanning lines formed on said first substrate;

a plurality of signal lines formed on said first substrate crossing said [the] scanning lines in a matrix manner;

a plurality of thin film transistors formed at each of intersections of said [the] scanning lines and said signal lines [, respectively];

a passivation film formed on said thin film transistors;

at least one color filter formed on said first substrate;

a plurality of pixel electrodes [electrode] connected to each of said [plurality of] thin film transistors through a contact hole[,];

[said second substrate including] a counter electrode formed on said second substrate; and

a liquid crystal layer between said first and second substrate [molecules] being driven by an electric field between said pixel electrode and said counter electrode to thereby make a display,

wherein said color filter is formed directly on said first substrate in most of a light transmission region within a pixel area surrounded by said scanning lines and said signal lines, and [a passivation film for protecting said thin film transistors; and]

a stacking layer of said passivation film and said color filter is formed near said contact hole, and

said overcoat layer is formed on said filter, and

said pixel electrode is formed [arranged] on said color filter [and connected to said thin film transistors through a contact hole provided in said passivation film and said color filter; and

gate insulating layers of said thin film transistors and said passivation film being removed in a light transmission region within pixels surrounded by said scanning lines and said signal lines].

2. (Twice Amended) An active matrix liquid crystal display device comprising:

a first substrate and a second substrate, at least one of said [the] first and second substrate being transparent;

[a liquid crystal layer formed between the first and second substrate;

a color filter;

an overcoat layer protecting said color filter, said first substrate including] a plurality of scanning lines formed on said first substrate;

a plurality of signal lines formed on said first substrate crossing [the] said plurality of scanning lines in a matrix manner;

a plurality of thin film transistors formed at each of intersections of [the] said scanning lines and [the] said signal lines[, respectively];

a passivation film formed on said thin film transistors;

at least one color filter formed on said first substrate;

an overcoat layer formed on said color filter;

a plurality of pixel electrodes [electrode] connected to each of said thin film transistors through a contact hole[,];

[said second substrate including] a counter electrode formed on said second substrate;[,] and

a liquid crystal layer between said first and second substrate [liquid crystal molecules] being driven by an electric field between said pixel electrode and said counter electrode to thereby make a display,

wherein said color filter is formed directly on said first substrate in most of a light

transmission region within a pixel area surrounded by said scanning lines and said signal lines, and

[a passivation film for protecting said thin film transistors, said]

a stacking layer of said passivation film, said color filter and said overcoat layer is formed near said contact hole, and

[said overcoat layer is formed on said color filter, and]

said pixel electrode is formed [arranged] on said overcoat layer [and connected to said thin film transistors through a contact hole provided in said passivation film, said color filter and said overcoat layer; and

gate insulating layers of said thin film transistors and said passivation film are removed in a light transmission region within pixels surrounded by said scanning lines and said signal lines].

6. (Twice Amended) A method of manufacturing an active matrix liquid crystal display device, the method comprising:

forming a plurality of scanning lines on a first substrate;

forming a plurality of signal lines crossing the plurality of scanning lines in a matrix manner;

forming a plurality of thin film transistors at intersections of the plurality of scanning lines and the plurality of signal lines, respectively;

forming a pixel electrode connected to said thin film transistors;

forming a counter electrode on a second substrate;

injecting a liquid crystal between said first substrate and said second substrate and sealing the liquid crystals,

wherein said method further comprises:

forming a passivation film to protect each of said thin film transistors;

removing part of a gate insulating layer and said passivation film of each of said thin film transistors in a region surrounded by said signal lines and said scanning lines;

forming a color filter [made of] comprising a photosensitive color resist;

forming a contact hole in said color filter and said passivation film on each of said thin film transistors; and

forming a plurality of pixel electrodes comprising a transparent conductive film electrically connected through said contact hole.

7. (Twice Amended) A method of manufacturing an active matrix liquid crystal display device, the method comprising :

forming a plurality of scanning lines on a first substrate;

forming a plurality of signal lines crossing the plurality of scanning lines in a matrix manner;

forming a plurality of thin film transistors at intersections of the plurality of scanning lines and the plurality of signal lines, respectively;

forming a pixel electrode connected to said thin film transistors;

forming a counter electrode on a second substrate;

injecting liquid crystal between said first substrate and said second substrate and sealing the liquid crystals,

wherein said method further comprises:

forming a passivation film to protect each of said thin film transistors;

removing part of a gate insulating layer and said passivation film of each of said thin film transistors in a region surrounded by said signal lines and said scanning lines;

forming a color filter [made of] comprising a photosensitive color resist;

forming an overcoat layer on said color filter;

patterning said overcoat layer;

forming a contact hole by patterning said color filter while using said overcoat layer as a mask; and

forming a plurality of pixel electrodes comprising a transparent conductive film electrically connected through said contact hole.